Instructions to the Students:
1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/O)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Explain instrument transformer.	CO1	06
B)	Write EMF equation & explain condition for maximum efficiency.	CO1	06
C)	A 4 KVA 200/400 V, 1Ø transformer has equivalent resistance and reactance referred to low voltage side equal to 0.5 Ω & 1.5 Ω respectively, find the terminal voltage on the high voltage side when it supplies ¾ th full load at power factor of 0.8, the supply voltage being 220 V. Hence find the output of the transformer and it's efficiency if the core losses are 100 W.	CO1	06
Q.2	**Solve Any Two of the following.**		
A)	Enlist different transformer connection & explain any two on that.	CO2	6
B)	What is necessity of parallel operation of transformer? Discuss the conditions to be satisfied for proper parallel operation of two transformers.	CO2	6
C)	Explain 3 winding transformer and its equivalent circuit.	CO2	6
Q. 3	**Solve Any Two of the following.**		
A)	Write the equation for force that governs doubly excited magnetic field.	CO3	6
B)	Define co energy and draw the graphical relation between field energy and co-energy	CO3	6
C)	Define Pole pitch, Pitch factor, Chording angle	CO3	6
Q.4	**Solve Any Two of the following.**		
A)	Draw and explain construction of DC generator.	CO4	6
B)	Explain armature reaction with cross magnetizing and demagnetizing.	CO4	6
C)	An 8- pole D.C. shunt generator with 778 wave connected armature conductors and running at 500 rpm supplies a load of 12.5 Ω resistances at terminal voltage of 250 V. The armature resistance is 0.24 Ω and the field resistance is 250 Ω, find the armature current, the induced emf & the flus per pole	CO4	6

Q. 5	Solve Any Two of the following.		
A)	Enlist & explain any two speed control method of DC shunt motor.	CO5	6
B)	Draw & explain characteristics of DC series motor	CO5	6
C)	Explain stepper motor and write its types	CO6	6
	*** End ***		

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